REMARKS/ARGUMENTS

The Examiner is thanked for the thorough examination and search of the subject.

Claims 163-208 are pending; Claims 163, 166-170, 178-180, 182-193, 197-204 and 208 have been currently amended; Claims 1-162 have been canceled. No new matter is believed to have been added.

Response to Claim Rejections under 35 U.S.C. 112

Reconsiderations of Claims 163-208 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement are requested based on the following remarks.

The Examiner considers that "the term "polymer" is broader than the disclosed more narrower range of interlevel dielectric layers, disclosed specifically as "polyimide, benzocyclobutene, porous dielectric material and stress buffer material". There is no support for broadening the "dielectric layer" disclosure to include "polymer". There is no support for broadening the "dielectric layer" disclosure to include "polymer". The disclosed "filling layer" is specifically stated to be "epoxy" or "polymer", however, the filling layer is not the "dielectric" layer and there is no support for multiple polymer layers. There can be multiple "dielectric" layers but not multiple polymer (="filling") layers. All claims are considered new matter." ~ *See lines 11-21 on page 2, in the Final Office Action mailed Dec. 10, 2008 and lines 1 and 2 on page 2, in the Advisory Office Action mailed Mar. 26, 2009* ~

Applicants respectfully traverse the Examiner's opinion because polymer layers or insulating layers are not new matters and can be claimed as broader terms. Polyimide, benzocyclobutene and epoxy are well known of polymers or insulating

materials, and therefore the interlevel dielectric layers, such as polyimide or benzocyclobutene, and the filling layer, such as epoxy, can be deemed as polymer layers or insulating layers. Therefore, the subject matters that "the interlevel dielectric layers are polymer layers or insulating layers" and that "the filling layer is a polymer layer or an insulating layer" are believed to be supported in the original specification and are believed not to be new matters as mentioned by the Examiner.

A broader term or broader concept is believed to be allowed to be recited in claims only if the broader term is supported in the original specification. As a general proposition, broadening modifiers are standard tools in claim drafting in order to avoid reliance on the doctrine of equivalents in infringement actions. ~ *See the third paragraph in M.P.E.P. 2173.05(b)* ~

Therefore, the term of "polymer layer" or "insulating layer" is believed to be allowed to be recited in claims even though the term of "polymer layer" or "insulating layer" is broader than the terms of "polyimide", "benzocyclobutene" and "epoxy". Withdrawal of rejection under 35 U.S.C. 112, first paragraph, to Claims 163-208 is respectfully requested.

Response to Claim Rejections under 35 U.S.C. 103

Applicants respectfully traverse the rejections for at least the reasons set forth below.

Response to Claims 163-178

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As currently amended, independent claim 163 is recited below:

163. A chip package comprising:

a first insulating layer;

a die between a first portion of said first insulating layer and a second portion of said first insulating layer, wherein said die has a top surface substantially coplanar with a top surface of said first portion and with a top surface of said second portion;

a second insulating layer on said top surface of said die and on said top surfaces of said first and second portions;

a first patterned metal layer over said second insulating layer, over said top surface of said die and over said top surfaces of said first and second portions, wherein said first patterned metal layer is connected to said die through an opening in said second insulating layer, and wherein said first patterned metal layer comprises electroplated copper;

a passive device over said second insulating layer, wherein said passive device comprises a portion directly over said top surface of said first portion;

a third insulating layer on said first patterned metal layer, on said passive device, over said second insulating layer, over said top surface of said die and over said top surfaces of said first and second portions; and

a metal bump directly over said top surface of said first portion, wherein said metal bump is connected to said die through said first patterned metal layer.

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Reconsiderations of Claims 163-178 rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger et al. (U.S. Pat. No. 6,396,148) in view of Wagner et al. (U.S. Pat. No. 5,196,377) and Wachtler et al. (U.S. Pat. No. 6,707,124) are requested based on the following remarks.

Applicants respectfully assert that the chip package currently claimed in Claim 163 patentably distinguishes over the citations by Eichelberger et al. (U.S. Pat. No. 6,396,148) in view of Wagner et al. (U.S. Pat. No. 5,196,377) and Wachtler et al. (U.S. Pat. No. 6,707,124).

The Examiner considers that "There is no original language specifically stating the dielectric layers are "polymer". The generic term "polymer" is clearly much broader or of different scope than the specifically disclosed "dielectric" layers and specifically "PI, BCB, porous dielectric layer, and stress buffer material" for the dielectric layers. "Polymer" is new matter here and does not have original basis". *~ See lines 12-17 on page 3, in the Final Office Action mailed Dec. 10, 2008 and lines 1 and 2 on page 2, in the Advisory Office Action mailed Mar. 26, 2009 ~*

Applicants respectfully traverse the Examiner's opinion because there is an original language specifically stating the dielectric layers are "polymer" and "polymer" is not a new matter and has original basis. In Para. [0027] in the original specification, Applicants teach that "The material of filling layer 130 can be epoxy, polymer, or the like." In Para. [0028] in the original specification, Applicants teach that "The material of dielectric layer 142 can be poly-Imide (PI), benzocyclobutene (BCB), porous dielectric material, stress buffer material, or the like." Polyimide, benzocyclobutene and epoxy are well known of polymers or insulating materials, and therefore the dielectric layer 142, such as polyimide or benzocyclobutene, and the filling layer 130, such as epoxy, can be deemed as polymer layers or insulating layers. Therefore, the subject matters that "the dielectric layer 142 is a polymer layers or an insulating layer" and that "the filling layer 130 is a polymer layer or an insulating layer" are believed to be supported in the original specification and are believed not to be new matters as mentioned by the Examiner.

A broader term or broader concept is believed to be allowed to be recited in claims only if the broader term is supported in the original specification. As a general proposition, broadening modifiers are standard tools in claim drafting in order to avoid reliance on the doctrine of equivalents in infringement actions. *~ See the third paragraph in M.P.E.P. 2173.05(b) ~*

Therefore, the term of "polymer layer" or "insulating layer" is believed to be

allowed to be recited in claims even though the term of "polymer layer" or "insulating layer" is broader than the terms of "polyimide", "benzocyclobutene" and "epoxy".

The Examiner considers that "In regard to "electroplated copper" applicant argues limitations not in the claims, specifically "grain size", "crystal orientation" and "seed layer", and therefore the arguments are not convincing of patentability." ~ *See lines 18-20 on page 3, in the Final Office Action mailed Dec. 10, 2008 and lines 2 and 3 on page 2, in the Advisory Office Action mailed Mar. 26, 2009* ~

Applicants respectfully traverse the Examiner's opinion because "electroplated copper" can be expected to impart distinctive structural characteristics to the final product in the grain size using a TEM cross-section or in the crystal orientation using a TEM cross-section or an X-ray diffraction analysis.

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The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., In re Garnero, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) (holding "interbonded by interfusion" to limit structure of the claimed composite and noting that terms such as "welded," "intermixed," "ground in place," "press fitted," and "etched" are capable of construction as structural limitations.) ~ *Extracted from MPEP 2113* ~

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Under the rule on MPEP 2113, it is believed that the structures of "electroplated copper" implied by a process step should be considered because "electroplated copper" can be expected to impart distinctive structural characteristics to the final product in the crystal orientation or the grain size by using a TEM or an

X-ray diffraction analysis.

The Examiner considers that "The new limitations are not patentable as Eichelberger discloses multiple layers of metallizations on polymer dielectrics and directly over dies wherein the metalizations inherently comprise resistance, capacitance and inductance, hence are "passive devices"" and that "The metalizations comprise capacitance, resistance and inductance inherently. There are no specific "passive devices" claimed structurally distinguishing over the metallization "passive devices" of the applied art". ~ *See line 24 of page 2 through line 1 of page 3, and lines 5-8 on page 4, in the Final Office Action mailed Dec. 10, 2008* ~

Applicants respectfully traverse the Examiner's opinion. Even though, in Fig. 2 in U.S. Pat. No. 6,396,148, Eichelberger's metallization structure 108 and 114 creates resistance, capacitance and inductance, Eichelberger fails to teach, hint or suggest that the resistance, capacitance and inductance can be used for a resistor, capacitor or inductor. The Examiner would not focus too much on whether a metallization structure comprises multiple circuit layers and multiple insulating layers therebetween is disclosed or not, but instead reconsider the functional limitation. A functional limitation should be evaluated and considered, just like any other structural limitation in a claim. ~ *See M.P.E.P. 2173.05(g)* ~

Furthermore, all of Eichelberger et al., Wagner et al. and Wachtler et al. fail to teach, hint or suggest that there can be a passive device over a second insulating layer on top surfaces of first and second portions of a first insulating layer and on a top surface of a die between said first and second portions, and wherein said passive device comprises a portion directly over said top surface of said first portion, as currently claimed in Claim 163.

For at least the foregoing reasons, withdrawal of rejection under 35 U.S.C. 103(a) to Claim 163 is respectfully requested.

Applicants respectfully submit independent Claim 163 patently distinguishes over the prior art references, and should be allowed. For at least the same reasons, dependent Claims 164-178 patently define over the prior art as well.

Response to Claims 179-196

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As currently amended, independent Claim 179 is recited below:

179. A chip package comprising:

a first insulating layer;

a die between a first portion of said first insulating layer and a second portion of said first insulating layer, wherein said die has a top surface substantially coplanar with a top surface of said first portion and with a top surface of said second portion;

a second insulating layer on said top surface of said die and on said top surfaces of said first and second portions;

a patterned metal layer over said second insulating layer, over said top surface of said die and over said top surfaces of said first and second portions, wherein said patterned metal layer is connected to a first metal pad of said die through a first opening in said second insulating layer, and to a second metal pad of said die through a second opening in said second insulating layer, wherein said first metal pad is connected to said second metal pad through said patterned metal layer; and

a metal bump directly over said top surface of said first portion, wherein said metal bump is connected to said die through said patterned metal layer.

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Reconsiderations of Claims 179-196 rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger et al. (U.S. Pat. No. 6,396,148) in view of Wagner et

al. (U.S. Pat. No. 5,196,377) and Wachtler et al. (U.S. Pat. No. 6,707,124) are requested based on the following remarks.

Applicants respectfully assert that the chip package currently claimed in Claim 179 patentably distinguishes over the citations by Eichelberger et al. (U.S. Pat. No. 6,396,148) in view of Wagner et al. (U.S. Pat. No. 5,196,377) and Wachtler et al. (U.S. Pat. No. 6,707,124).

The Examiner considers that "There is no original language specifically stating the dielectric layers are "polymer". The generic term "polymer" is clearly much broader or of different scope than the specifically disclosed "dielectric" layers and specifically "PI, BCB, porous dielectric layer, and stress buffer material" for the dielectric layers. "Polymer" is new matter here and does not have original basis". *~ See lines 12-17 on page 3, in the Final Office Action mailed Dec. 10, 2008 and lines 1 and 2 on page 2, in the Advisory Office Action mailed Mar. 26, 2009 ~*

Applicants respectfully traverse the Examiner's opinion because there is an original language specifically stating the dielectric layers are "polymer" and "polymer" is not a new matter and has original basis. In Para. [0027] in the original specification, Applicants teach that "The material of filling layer 130 can be epoxy, polymer, or the like." In Para. [0028] in the original specification, Applicants teach that "The material of dielectric layer 142 can be poly-Imide (PI), benzocyclobutene (BCB), porous dielectric material, stress buffer material, or the like." Polyimide, benzocyclobutene and epoxy are well known of polymers or insulating materials, and therefore the dielectric layer 142, such as polyimide or benzocyclobutene, and the filling layer 130, such as epoxy, can be deemed as polymer layers or insulating layers. Therefore, the subject matters that "the dielectric layer 142 is a polymer layers or an insulating layer" and that "the filling layer 130 is a polymer layer or an insulating layer" are believed to be supported in the original specification and are believed not to be new matters as mentioned by the Examiner.

A broader term or broader concept is believed to be allowed to be recited in claims only if the broader term is supported in the original specification. As a general proposition, broadening modifiers are standard tools in claim drafting in order to avoid reliance on the doctrine of equivalents in infringement actions. ~ *See the third paragraph in M.P.E.P. 2173.05(b)* ~

Therefore, the term of "polymer layer" or "insulating layer" is believed to be allowed to be recited in claims even though the term of "polymer layer" or "insulating layer" is broader than the terms of "polyimide", "benzocyclobutene" and "epoxy".

Furthermore, all of Eichelberger et al., Wagner et al. and Wachtler et al. fail to teach, hint or suggest that there can be a metal bump directly over a top surface of a first portion of a first insulating layer, wherein a die is between said first portion and a second portion of said first insulating layer, as currently claimed in Claim 163.

For at least the foregoing reasons, withdrawal of rejection under 35 U.S.C. 103(a) to Claim 179 is respectfully requested.

Applicants respectfully submit independent Claim 179 patently distinguishes over the prior art references, and should be allowed. For at least the same reasons, dependent Claims 180-196 patently define over the prior art as well.

Response to Claims 197-208

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As currently amended, independent Claim 197 is recited below:

197. A chip package comprising:

a first insulating layer;

a die between a first portion of said first insulating layer and a second

portion of said first insulating layer, wherein said die has a top surface substantially coplanar with a top surface of said first portion and with a top surface of said second portion;

a second insulating layer on said top surface of said die and on said top surfaces of said first and second portions;

a patterned metal layer over said second insulating layer, over said top surface of said die and over said top surfaces of said first and second portions, wherein said patterned metal layer comprises electroplated copper, and wherein said patterned metal layer comprises a ground bus connected to a first metal pad of said die through a first opening in said second insulating layer, and to a second metal pad of said die through a second opening in said second insulating layer, wherein said first metal pad is connected to said second metal pad through said ground bus; and

a metal bump directly over said top surface of said first portion, wherein said metal bump is connected to said die through said patterned metal layer.

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Reconsiderations of Claims 197-208 rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger et al. (U.S. Pat. No. 6,396,148) in view of Wagner et al. (U.S. Pat. No. 5,196,377) and Wachtler et al. (U.S. Pat. No. 6,707,124) are requested based on the following remarks.

Applicants respectfully assert that the chip package currently claimed in Claim 197 patentably distinguishes over the citations by Eichelberger et al. (U.S. Pat. No. 6,396,148) in view of Wagner et al. (U.S. Pat. No. 5,196,377) and Wachtler et al. (U.S. Pat. No. 6,707,124).

The Examiner considers that "There is no original language specifically stating the dielectric layers are "polymer". The generic term "polymer" is clearly much broader or of different scope than the specifically disclosed "dielectric" layers and

specifically "PI, BCB, porous dielectric layer, and stress buffer material" for the dielectric layers. "Polymer" is new matter here and does not have original basis". *~ See lines 12-17 on page 3, in the Final Office Action mailed Dec. 10, 2008 and lines 1 and 2 on page 2, in the Advisory Office Action mailed Mar. 26, 2009 ~*

Applicants respectfully traverse the Examiner's opinion because there is an original language specifically stating the dielectric layers are "polymer" and "polymer" is not a new matter and has original basis. In Para. [0027] in the original specification, Applicants teach that "The material of filling layer 130 can be epoxy, polymer, or the like." In Para. [0028] in the original specification, Applicants teach that "The material of dielectric layer 142 can be poly-Imide (PI), benzocyclobutene (BCB), porous dielectric material, stress buffer material, or the like." Polyimide, benzocyclobutene and epoxy are well known of polymers or insulating materials, and therefore the dielectric layer 142, such as polyimide or benzocyclobutene, and the filling layer 130, such as epoxy, can be deemed as polymer layers or insulating layers. Therefore, the subject matters that "the dielectric layer 142 is a polymer layers or an insulating layer" and that "the filling layer 130 is a polymer layer or an insulating layer" are believed to be supported in the original specification and are believed not to be new matters as mentioned by the Examiner.

A broader term or broader concept is believed to be allowed to be recited in claims only if the broader term is supported in the original specification. As a general proposition, broadening modifiers are standard tools in claim drafting in order to avoid reliance on the doctrine of equivalents in infringement actions. *~ See the third paragraph in M.P.E.P. 2173.05(b) ~*

Therefore, the term of "polymer layer" or "insulating layer" is believed to be allowed to be recited in claims even though the term of "polymer layer" or "insulating layer" is broader than the terms of "polyimide", "benzocyclobutene" and "epoxy".

The Examiner considers that "In regard to "electroplated copper" applicant argues limitations not in the claims, specifically "grain size", "crystal orientation" and "seed layer", and therefore the arguments are not convincing of patentability." ~ *See lines 18-20 on page 3, in the Final Office Action mailed Dec. 10, 2008 and lines 2 and 3 on page 2, in the Advisory Office Action mailed Mar. 26, 2009* ~

Applicants respectfully traverse the Examiner's opinion because "electroplated copper" can be expected to impart distinctive structural characteristics to the final product in the grain size using a TEM cross-section or in the crystal orientation using a TEM cross-section or an X-ray diffraction analysis.

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The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., In re Garnero, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) (holding "interbonded by interfusion" to limit structure of the claimed composite and noting that terms such as "welded," "intermixed," "ground in place," "press fitted," and "etched" are capable of construction as structural limitations.) ~ *Extracted from MPEP 2113* ~

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Under the rule on MPEP 2113, it is believed that the structures of "electroplated copper" implied by a process step should be considered because "electroplated copper" can be expected to impart distinctive structural characteristics to the final product in the crystal orientation or the grain size by using a TEM or an X-ray diffraction analysis.

Furthermore, all of Eichelberger et al., Wagner et al. and Wachtler et al. fail to

teach, hint or suggest that there can be a metal bump directly over a top surface of a first portion of a first insulating layer, wherein a die is between said first portion and a second portion of said first insulating layer, as currently claimed in Claim 197.

For at least the foregoing reasons, withdrawal of rejection under 35 U.S.C. 103(a) to Claim 197 is respectfully requested.

Applicants respectfully submit independent Claim 197 patently distinguishes over the prior art references, and should be allowed. For at least the same reasons, dependent Claims 198-208 patently define over the prior art as well.

Conclusion

Some or all of the pending claims are believed to be in condition for allowance. Accordingly, allowance of the claims and the application as a whole are respectfully requested.

Sincerely yours,

/Winston Hsu/ Date: 04/10/2009

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Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 12 hours behind the Taiwan time, i.e. 9 AM in D.C. = 9 PM in Taiwan.)